POWER WINDOW SYSTEMS

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GENERAL INFORMATION

INTRODUCTION

Power windows are available as factory-installed optional equipment on this model. The Remote Keyless Entry (RKE) system and power lock system are included on vehicles equipped with the power window option. Refer to 8W-60 - Power Windows in Group 8W - Wiring Diagrams for complete circuit descriptions and diagrams.

POWER WINDOW SYSTEM

The power window system allows each of the door windows to be raised and lowered electrically by actuating a switch on the trim panel of each respective door. A master switch on the driver side front door trim panel allows the driver to raise or lower each of the passenger door windows and, on quad cab models, to lock out the individual switches on the passenger doors from operation. The power window system receives battery feed through a circuit breaker in the junction block, only when the ignition switch is in the On position.

The power window system includes the power window switches on each door trim panel, the circuit breaker in the junction block, and the power window motors inside each door. This group covers diagnosis and service of only the electrical components in the power window system. For service of mechanical components, such as the regulator, lift plate, window tracks, or glass refer to Group 23 - Body.

Following are general descriptions of the major components in the power window system. Refer to the owner's manual in the vehicle glove box for more information on the features, use and operation of the power window system.

DESCRIPTION AND OPERATION

POWER WINDOW SWITCH

On conventional cab and club cab models, the power windows are controlled by two-way switches integral to the power window and lock switch and bezel unit on the trim panel of each front door. A second power window switch in the driver side switch and bezel unit allows the driver to control the passenger side window. On quad cab models, the power windows are controlled by four two-way switches and a power window lockout switch that are integral to the power window and lock switch unit on the driver side front door trim panel. Additionally, each of the passenger doors has a single gang two-way power window switch mounted in a bezel on their respective door trim panels.

On all models, the power window switch for the driver side front door window has an Auto label on it. This switch has a second detent position beyond the normal Down position that provides an automatic one-touch window down feature. This feature is controlled by an electronic circuit and a relay that are integral to the driver side front door power window and lock switch unit.

The power window switches control the battery and ground feeds to the power window motors. All of the passenger door power window switches receive their battery and ground feeds through the circuitry of the driver side master switch unit. On quad cab models, when the power window lockout switch is in the Lock position, the battery feed for the individual passenger door power window switches is interrupted.

A Light-Emitting Diode (LED) in the paddle of each switch is illuminated whenever the ignition switch is in the On position. However, on quad cab

DESCRIPTION AND OPERATION (Continued)

models the LEDs for the passenger power window switches are extinguished whenever the driver selects the Lock position with the power window lockout switch.

On all models, the driver side power window and lock switch and bezel unit cannot be repaired and, if faulty or damaged, the entire switch unit must be replaced. On conventional cab and club cab models, the passenger side power window and lock switch and bezel unit cannot be repaired and, if faulty or damaged, the entire switch and bezel unit must be replaced. On quad cab models, the individual passenger power window switches cannot be repaired and, if faulty or damaged, the single gang switch unit must be replaced.

POWER WINDOW MOTOR

A permanent magnet reversible motor moves the window regulator through an integral gearbox mechanism. A positive and negative battery connection to the two motor terminals will cause the motor to rotate in one direction. Reversing the current through these same two connections will cause the motor to rotate in the opposite direction.

In addition, each power window motor is equipped with an integral self-resetting circuit breaker to protect the motor from overloads. The power window motor and gearbox assembly cannot be repaired and, if faulty or damaged, the entire power window regulator assembly must be replaced.

CIRCUIT BREAKER

An automatic resetting circuit breaker in the junction block is used to protect the power window system circuit. The circuit breaker can protect the system from a short circuit, or from an overload condition caused by an obstructed or stuck window glass or regulator.

The circuit breaker cannot be repaired and, if faulty, it must be replaced.

DIAGNOSIS AND TESTING

POWER WINDOW SYSTEM

For circuit descriptions and diagrams, refer to 8W-60 - Power Windows in Group 8W - Wiring Diagrams.

ALL WINDOWS INOPERATIVE

(1) Check the circuit breaker in the junction block, as described in this group. If OK, go to Step 2. If not OK, replace the faulty circuit breaker.

(2) Disconnect and isolate the battery negative cable. Remove the power window and lock master switch unit from the driver side front door trim panel. Unplug the wire harness connector from the master switch unit.

(3) Check for continuity between the ground circuit cavity of the power window and lock master switch unit wire harness connector and a good ground. If OK, go to Step 4. If not OK, repair the circuit to ground as required.

(4) Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run) circuit cavity of the power window and lock master switch unit wire harness connector. If OK, see Power Window Switch in the Diagnosis and Testing section of this group. If not OK, repair the circuit to the junction block as required.

ONE WINDOW INOPERATIVE

The window glass must be free to slide up and down for the power window motor to function properly. If the glass is not free to move up and down, the motor will overload and trip the integral circuit breaker. To determine if the glass is free, disconnect the regulator plate from the glass. Then slide the window up and down by hand.

There is an alternate method to check if the glass is free. Position the glass between the up and down stops. Then, shake the glass in the door. Check that the glass can be moved slightly from side to side, front to rear, and up and down. Then check that the glass is not bound tight in the tracks. If the glass is free, proceed with the diagnosis that follows. If the glass is not free, refer to Group 23 - Body for the door window glass and hardware service and adjustment procedures.

If the only inoperative window is in the driver side front door and the preceding checks have not identified a problem, see Power Window Motor in the Diagnosis and Testing section of this group. If the problem being diagnosed involves only the Auto-down feature for the driver side front door window, but all of the power windows are operational, replace the faulty power window and lock master switch unit. If the problem being diagnosed involves only an inoperative power window switch Light-Emitting Diode (LED), but the power window that the switch controls operates satisfactorily from that switch, replace the faulty switch unit. For any other single power window problem proceed with diagnosis as follows:

(1) Disconnect and isolate the battery negative cable. Unplug the wire harness connector from the power window switch unit on the door with the inoperative power window. Check for continuity between the ground circuit cavity of the power window switch wire harness connector and a good ground. There should be continuity. If OK, go to Step 2. If not OK,

DIAGNOSIS AND TESTING (Continued)

repair the open circuit to the power window and door lock master switch as required.

(2) Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run) circuit cavity in the body half of the power window switch unit wire harness connector. If OK, go to Step 3. If not OK, repair the open circuit to the power window and door lock master switch as required.

(3) Test the power window switch continuity. See Power Window Switch in the Diagnosis and Testing section of this group. If OK, go to Step 4. If not OK, replace the faulty power window switch unit.

(4) Refer to the circuit diagrams in 8W-60 - Power Windows in Group 8W - Wiring Diagrams. Check the continuity in each circuit between the inoperative power window switch wire harness connector cavities and the corresponding power window motor wire harness connector cavities. If OK, see Power Window Motor in the Diagnosis and Testing section of this group. If not OK, repair the open circuit(s) as required.

NOTE: All passenger door power window switches receive their battery and ground feed for operating the passenger door power window motors through the driver side power window and lock master switch and wire harness connector.

CIRCUIT BREAKER

For circuit descriptions and diagrams, refer to 8W-60 - Power Windows in Group 8W - Wiring Diagrams.

(1) Locate the circuit breaker in the junction block. Pull out the circuit breaker slightly, but be certain that the circuit breaker terminals still contact the terminals in the junction block cavities.

(2) Connect the negative lead of a 12-volt DC voltmeter to a good ground.

(3) With the voltmeter positive lead, check both terminals of the circuit breaker for battery voltage.

If only one terminal has battery voltage, the circuit breaker is faulty and must be replaced. If neither terminal has battery voltage, repair the open circuit from the Power Distribution Center (PDC) as required. If the circuit breaker checks OK, but no power windows operate, see Power Window System in the Diagnosis and Testing section of this group.

POWER WINDOW SWITCH

CONVENTIONAL CAB AND CLUB CAB

The Light-Emitting Diode (LED) illumination lamps for all of the power window and lock switch and bezel unit switch paddles receive battery current through the power window circuit breaker in the junction block. If all of the LEDs are inoperative in either or both power window and lock switch and bezel units and the power windows are inoperative, perform the diagnosis for Power Window System in this group. If the power windows operate, but any or all of the LEDs are inoperative, the power window and lock switch and bezel unit with the inoperative LED(s) is faulty and must be replaced. For circuit descriptions and diagrams, refer to 8W-60 - Power Windows in Group 8W - Wiring Diagrams.

(1) Check the circuit breaker in the junction block. If OK, go to Step 2. If not OK, replace the faulty circuit breaker.

(2) Turn the ignition switch to the On position. Check for battery voltage at the circuit breaker in the junction block. If OK, turn the ignition switch to the Off position and go to Step 3. If not OK, repair the circuit to the ignition switch as required.

(3) Disconnect and isolate the battery negative cable. Remove the power window and lock switch and bezel unit from the door trim panel. Unplug the wire harness connector from the switch and bezel unit.

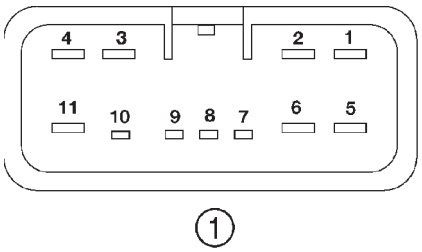
(4) Test the power window switch continuity. See the Power Window Switch Continuity charts to determine if the continuity is correct in the Neutral, Up and Down switch positions (Fig. 1) or (Fig. 2). If OK, see Power Window Motor in the Diagnosis and Testing section of this group. If not OK, replace the faulty switch.

NOTE: The auto down feature of the driver side power window switch is controlled by an electronic circuit within the switch unit. The auto down circuitry is activated when the driver side power window switch is moved to the second detent in the Down direction. The outputs from the auto down circuitry are carried through the same switch pins that provide the normal down function. The auto down circuit cannot be tested. If the driver side power window switch continuity tests are passed, but the auto down feature is inoperative, replace the faulty driver side power window switch unit.

QUAD CAB

The Light-Emitting Diode (LED) illumination lamps for all of the power window and lock switch and bezel unit switch paddles receive battery current through the power window circuit breaker in the junction block. If all of the LEDs are inoperative in both the power window and lock switch units and the power windows are inoperative, perform the diagnosis for Power Window System in this group. If the power windows operate, but any or all of the LEDs are inoperative, the power window and lock switch units with the inoperative LED(s) is faulty and must be replaced. For circuit descriptions and diagrams,

DIAGNOSIS AND TESTING (Continued)



PASSENGER SIDE WINDOW SWITCH	
SWITCH POSITION	CONTINUITY BETWEEN
NEUTRAL	1 & 4, 2 & 3
UP	2 & 3, 4 & 11
DOWN	1 & 4, 3 & 11
LAMP	8 & 11

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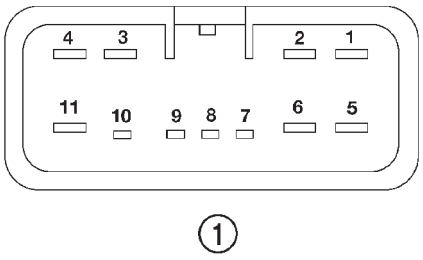
Fig. 1 Power Window Switch Continuity - Driver Side - Conventional Cab and Club Cab

1 – VIEW OF SWITCH SIDE CONNECTOR



PASSENGER SIDE WINDOW SWITCH	
SWITCH POSITION	CONTINUITY BETWEEN
NEUTRAL	1 & 4, 2 & 3
UP	2 & 3, 4 & 11
DOWN	1 & 4, 3 & 11
LAMP	8 & 11

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Fig. 2 Power Window Switch Continuity - Passenger Side - Conventional Cab and Club Cab

1 – VIEW OF SWITCH SIDE CONNECTOR

refer to 8W-60 - Power Windows in Group 8W - Wiring Diagrams.

(1) Check the circuit breaker in the junction block. If OK, go to Step 2. If not OK, replace the faulty circuit breaker.

(2) Turn the ignition switch to the On position. Check for battery voltage at the circuit breaker in the junction block. If OK, turn the ignition switch to the Off position and go to Step 3. If not OK, repair the circuit to the ignition switch as required.

(3) Disconnect and isolate the battery negative cable. Remove the power window switch unit from the door trim panel. Unplug the wire harness connector from the switch unit.

(4) Test the power window switch continuity. See the Power Window Switch Continuity charts to determine if the continuity is correct in the Off, Up and Down switch positions (Fig. 3) or (Fig. 4). If OK, see Power Window Motor in the Diagnosis and Testing section of this group. If not OK, replace the faulty switch.

NOTE: Because this switch contains active electronic elements for the Auto-down feature, this switch function cannot be checked with a continuity test. If the problem being diagnosed involves this function, reconnect the switch to its wire harness connector, connect the battery negative cable and turn the ignition switch to the On position. Back probe the wire harness connector cavity for switch pin number 8 and check for the proper switch output while actuating the switch. With the switch in the Up position, there should be continuity to ground at pin 8. With the switch in the Down position, there should be battery voltage at pin 8.

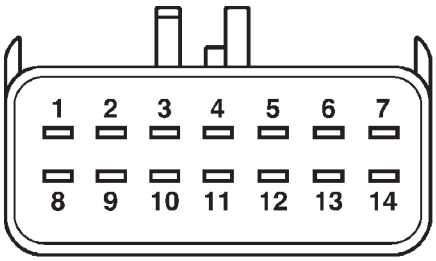
POWER WINDOW MOTOR

For circuit descriptions and diagrams, refer to 8W-60 - Power Windows in Group 8W - Wiring Diagrams. Before you proceed with this diagnosis, confirm proper switch operation. See Power Window Switch in the Diagnosis and Testing section of this group.

(1) Disconnect and isolate the battery negative cable. Remove the trim panel from the door with the inoperative power window.

(2) Unplug the power window motor wire harness connector. Apply 12 volts across the motor terminals to check its operation in one direction. Reverse the connections across the motor terminals to check the operation in the other direction. Remember, if the window is in the full up or full down position, the motor will not operate in that direction by design. If OK, repair the circuits from the power window motor to the power window switch as required. If not OK, replace the faulty motor.

DIAGNOSIS AND TESTING (Continued)



DRIVER SIDE FRONT WINDOW SWITCH (MASTER)	
SWITCH POSITION	CONTINUITY BETWEEN
OFF	2 & 5, 3 & 5, 5 & 6, 5 & 11, 5 & 12, 5 & 13, 5 & 14
RIGHT REAR UP	4 & 12, 5 & 11
RIGHT REAR DOWN	4 & 11, 5 & 12
RIGHT FRONT UP	2 & 5, 3 & 4
RIGHT FRONT DOWN	2 & 4, 3 & 5
LEFT REAR UP	4 & 14, 5 & 13
LEFT REAR DOWN	4 & 13, 5 & 14
LEFT FRONT UP	4 & 6, SEE NOTE
LEFT FRONT DOWN	5 & 6, SEE NOTE
POWER WINDOW LOCKOUT OFF	4 & 7

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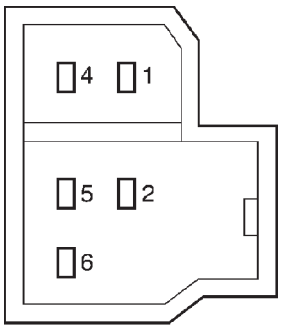
Fig. 3 Power Window Switch Continuity - Driver Side Front - Quad Cab

(3) If the motor operates in both directions, check the operation of the window glass and lift mechanism through its complete up and down travel. There should be no binding or sticking of the window glass or lift mechanism through the entire travel range. If not OK, refer to Group 23 - Body to check the window glass, tracks, and regulator for sticking, binding, or improper adjustment.



PASSENGER SIDE WINDOW SWITCH	
SWITCH POSITION	CONTINUITY BETWEEN
OFF	1 & 4, 2 & 5
UP	1 & 6, 2 & 5
DOWN	1 & 4, 5 & 6

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Fig. 4 Power Window Switch Continuity - Front and Rear Passenger Doors - Quad Cab

REMOVAL AND INSTALLATION

POWER WINDOW SWITCH

CONVENTIONAL CAB AND CLUB CAB

(1) Disconnect and isolate the battery negative cable.

(2) Using a wide flat-bladed tool such as a trim stick, gently pry the upper edge of the switch bezel at the front and the rear to release the clips that secure the switch bezel to the door trim panel opening (Fig. 5).

(3) Pull the switch and bezel unit away from the door trim panel opening far enough to access and unplug the wire harness connector.

(4) Remove the power window and lock switch and bezel unit from the door trim panel.

(5) Reverse the removal procedures to install. When installing the switch and bezel unit to the door trim panel opening, insert the rear of the bezel into the opening, then push down on the front of the bezel until the retaining clips snap into place.

QUAD CAB

DRIVER SIDE FRONT DOOR

(1) Disconnect and isolate the battery negative cable.

REMOVAL AND INSTALLATION (Continued)

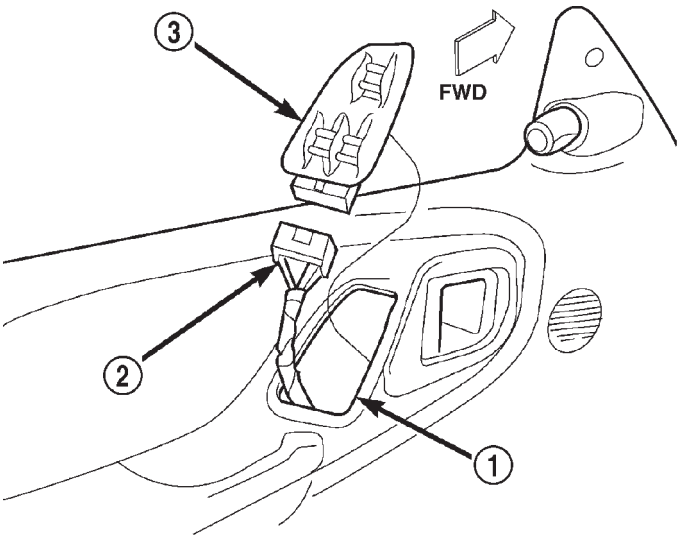

Fig. 5 Power Window and Lock Switch and Bezel Unit Remove/Install - Conventional Cab and Club Cab

1 – TRIM PANEL SWITCH BEZEL OPENING
2 – WIRE HARNESS CONNECTOR
3 – SWITCH AND BEZEL UNIT

(2) Remove the trim panel from the inside of the driver side front door. Refer to Group 23 - Body for the procedures.

(3) From the back side of the trim panel, remove the screws that secure the power window and lock switch unit to the switch bezel in the door trim panel opening.

(4) Remove the power window and lock switch and the switch bezel from the door trim panel.

(5) Reverse the removal procedures to install. Tighten the mounting screws to 2.2 N·m (20 in. lbs.).

FRONT AND REAR PASSENGER DOORS

(1) Disconnect and isolate the battery negative cable.

(2) Remove the trim panel from the inside of the passenger front or rear door. Refer to Group 23 - Body for the procedures.

(3) With a small thin-bladed screwdriver, gently pry the snap clips at the sides of the power window switch receptacle on the back of the door trim panel switch bezel and pull the switch out of the receptacle.

(4) Reverse the removal procedures to install. Be certain that both of the switch snap retainers in the receptacle on the back of the door trim panel switch bezel are fully engaged.

POWER WINDOW MOTOR

The power window motor and mechanism is integral to the power window regulator unit. If the power window motor or mechanism is faulty or damaged, the entire power window regulator unit must be replaced. Refer to Group 23 - Body for the window regulator service procedures.